

## NISTTech

### Fractional Phase Measurement by Polarization-Dependent Spectroscopy

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#### Abstract

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This invention provides an inexpensive, noninvasive optical method of quantitatively determining the volume fraction of anisotropic material in a mixture of anisotropic and isotropic material, and more particularly for determining the volume fraction of noncubic crystalline material in a mixed-phase specimen having noncubic crystalline material intermixed with cubic crystalline material. Polarized light is impinged on the specimen and the reflectance or transmission difference between two orthogonal polarization directions is measured. In cubic regions the reflectance or transmission is the same along both polarization directions so the contributions to the difference cancel, leaving a signal only from the noncubic regions. The optical difference can be measured as a function of wavelength and critical points in the band structure, including the band gap, can be profiled. From the band structure the film composition can be determined. This measurement is particularly suited to measuring III-V nitride semiconductor specimens having regions with zincblende symmetry mixed with regions of wurtzite symmetry.

#### Inventors

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#### References

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- U.S. Patent # 6,121,051 issued 09-19-2000, expires 01/07/2018
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#### Status of Availability

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patent active and available for licensing

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